

What is claimed is:

1. A zoom lens comprising, in order from an object side:

a first lens unit with positive refracting power;

a second lens unit with positive refracting power; and

a third lens unit with negative refracting power,

5 individual lens units being moved toward the object side in a magnification change of the zoom lens ranging from a wide-angle position to a telephoto position to thereby carry out the magnification change,

wherein the first lens unit is constructed with two lenses; the second lens unit has, in order from the object side, a first positive lens with a concave surface facing the  
10 object side and a second positive lens with a concave surface facing the object side; and the third lens unit is constructed with two lenses so that the first lens unit, the second lens unit, and third lens unit include six lenses in total.

2. A zoom lens comprising, in order from an object side:

a first lens unit with positive refracting power;

a second lens unit with positive refracting power; and

a third lens unit with negative refracting power,

5 individual lens units being moved toward the object side in a magnification change of the zoom lens ranging from a wide-angle position to a telephoto position so that spacings between lens units are varied and thereby the magnification change is carried out,

wherein the first lens unit has a single positive lens and a single negative lens; the  
10 second lens unit has, in order from the object side, a first positive lens with a concave surface facing the object side and a second positive lens with a concave surface facing the object side; and the third lens unit has, in order from the object side, a plastic lens with aspherical surfaces and a negative lens so that the first lens unit, the second

lens unit, and third lens unit include six lenses in total.

3. A zoom lens according to claim 1 or 2, wherein an aperture stop is placed on the object side of the second lens unit.

4. A zoom lens according to claim 1 or 2, satisfying the following condition:

$$1.3 < f_{21} / f_t < 2.5$$

where  $f_{21}$  is a focal length of the first positive lens and  $f_t$  is a focal length of the zoom lens at the telephoto position.

5. A zoom lens according to claim 1 or 2, wherein the first positive lens is constructed as a plastic lens having at least one aspherical surface.

6. A zoom lens according to claim 1 or 2, wherein the first positive lens is constructed as a plastic lens having at least one aspherical surface and the zoom lens satisfies the following condition:

$$0.17 < f_{22} / f_{21} < 0.25$$

5 where  $f_{21}$  is a focal length of the first positive lens and  $f_{22}$  is a focal length of the second positive lens.

7. A zoom lens according to claim 1 or 2, satisfying the following conditions:

$$1.0 < f_w / IH < 1.4$$

$$0.2 < f_{G2} / f_{G1} < 0.45$$

$$0.24 < fb_w / f_w < 0.40$$

5 where  $f_w$  is a focal length of the zoom lens at the wide-angle position,  $IH$  is a maximum image height,  $f_{G1}$  is a focal length of the first lens unit,  $f_{G2}$  is a focal length of the second lens unit, and  $fb_w$  is a back focal distance of the zoom lens at the wide-angle position.

8. A zoom lens according to claim 1 or 2, wherein spacing between the first lens unit and the second lens unit at the telephoto position is wider than the spacing between the first lens unit and the second lens unit at the wide-angle position, and spacing between the second lens unit and the third lens unit at the telephoto position is narrower than the spacing between the second lens unit and the third lens unit at the wide-angle position.

9. A camera having a zoom lens and means of limiting a photographing area, located on an image side thereof,

the zoom lens comprising, in order from an object side:

a first lens unit with positive refracting power;

a second lens unit with positive refracting power; and

a third lens unit with negative refracting power,

individual lens units being moved toward the object side in a magnification change of the zoom lens ranging from a wide-angle position to a telephoto position to thereby carry out the magnification change,

wherein the first lens unit is constructed with two lenses; the second lens unit has, in order from the object side, a first positive lens with a concave surface facing the object side and a second positive lens with a concave surface facing the object side; and the third lens unit is constructed with two lenses so that the first lens unit, the second lens unit, and third lens unit include six lenses in total,

the camera satisfying the following condition:

$$1.0 < f_w / IH < 1.4$$

where  $f_w$  is a focal length of the zoom lens at the wide-angle position and  $IH$  is a maximum image height.

10. A zoom lens according to claim 1 or 2, satisfying the following condition:

$$0.2 < f_{G2} / f_{G1} < 0.45$$

where  $f_{G1}$  is a focal length of the first lens unit and  $f_{G2}$  is a focal length of the second lens unit.

11. A zoom lens according to claim 1 or 2, satisfying the following condition:

$$0.24 < fb_w / f_w < 0.4$$

where  $fb_w$  is a back focal distance of the zoom lens at the wide-angle position and  $f_w$  is a focal length of the zoom lens at the wide-angle position.

12. A camera having a zoom lens and means of limiting a photographing area, located on an image side thereof,

the zoom lens comprising, in order from an object side:

a first lens unit with positive refracting power;

5 a second lens unit with positive refracting power; and

a third lens unit with negative refracting power,

individual lens units being moved toward the object side in a magnification change of the zoom lens ranging from a wide-angle position to a telephoto position to thereby carry out the magnification change,

10 wherein the first lens unit is constructed with two lenses; the second lens unit has, in order from the object side, a first positive lens with a concave surface facing the object side and a second positive lens with a concave surface facing the object side; and the third lens unit is constructed with two lenses so that the first lens unit, the second lens unit, and third lens unit include six lenses in total.

13. A zoom lens according to claim 1, satisfying the following condition:

$$1.4 < f_{21} / f_t < 2.5$$

where  $f_{21}$  is a focal length of the first positive lens and  $f_t$  is a focal length of the zoom lens at the telephoto position.

14. A zoom lens according to claim 1, satisfying the following condition:

$$1.49 < f_{21} / f_t < 2.5$$

where  $f_{21}$  is a focal length of the first positive lens and  $f_t$  is a focal length of the zoom lens at the telephoto position.

15. A zoom lens according to claim 1, wherein the first positive lens is constructed as a plastic lens having at least one aspherical surface and the zoom lens satisfies the following condition:

$$0.18 < f_{22} / f_{21} < 0.25$$

5 where  $f_{21}$  is a focal length of the first positive lens and  $f_{22}$  is a focal length of the second positive lens.

16. A zoom lens according to claim 1, wherein the first positive lens is constructed as a plastic lens having at least one aspherical surface and the zoom lens satisfies the following condition:

$$0.19 < f_{22} / f_{21} < 0.25$$

5 where  $f_{21}$  is a focal length of the first positive lens and  $f_{22}$  is a focal length of the second positive lens.

17. A camera according to claim 9, further satisfying the following condition:

$$1.1 < f_w / IH < 1.4$$

18. A camera according to claim 9, further satisfying the following condition:

$$1.15 < f_w / IH < 1.4$$

19. A zoom lens according to claim 10, further satisfying the following condition:

$$0.23 < f_{G2} / f_{G1} < 0.45$$

20. A zoom lens according to claim 10, further satisfying the following condition:

$$0.27 < f_{G2} / f_{G1} < 0.45$$

21. A zoom lens according to claim 11, further satisfying the following condition:

$$0.25 < fb_w / f_w < 0.4$$

22. A zoom lens according to claim 11, further satisfying the following condition:

$$0.26 < fb_w / f_w < 0.4$$

23. A zoom lens according to claim 1, satisfying the following condition:

$$1.3 < f_{21} / f_t < 2.3$$

where  $f_{21}$  is a focal length of the first positive lens and  $f_t$  is a focal length of the zoom lens at the telephoto position.

24. A zoom lens according to claim 1, satisfying the following condition:

$$1.3 < f_{21} / f_t < 2.0$$

where  $f_{21}$  is a focal length of the first positive lens and  $f_t$  is a focal length of the zoom lens at the telephoto position.

25. A zoom lens according to claim 1, wherein the first positive lens is constructed as a plastic lens having at least one aspherical surface and the zoom lens satisfies the following condition:

$$0.17 < f_{22} / f_{21} < 0.23$$

5 where  $f_{21}$  is a focal length of the first positive lens and  $f_{22}$  is a focal length of the second positive lens.

26. A zoom lens according to claim 1, wherein the first positive lens is constructed as a plastic lens having at least one aspherical surface and the zoom lens satisfies the

following condition:

$$0.17 < f_{22} / f_{21} < 0.22$$

- 5 where  $f_{21}$  is a focal length of the first positive lens and  $f_{22}$  is a focal length of the second positive lens.

27. A camera according to claim 9, further satisfying the following condition:

$$1.0 < f_w / IH < 1.37$$

28. A camera according to claim 9, further satisfying the following condition:

$$1.0 < f_w / IH < 1.35$$

29. A zoom lens according to claim 10, further satisfying the following condition:

$$0.2 < f_{G2} / f_{G1} < 0.42$$

30. A zoom lens according to claim 10, further satisfying the following condition:

$$0.2 < f_{G2} / f_{G1} < 0.38$$

31. A zoom lens according to claim 11, further satisfying the following condition:

$$0.24 < fb_w / f_w < 0.35$$

32. A zoom lens according to claim 11, further satisfying the following condition:

$$0.24 < fb_w / f_w < 0.30$$

33. A zoom lens according to claim 1 or 2, having six lens elements in total.

34. A camera according to claim 12, wherein the zoom lens has six lens elements in total.